Factors Influencing Farmers' Membership Preferences in Agricultural Cooperatives in Ethiopia

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Abstract A study entitled factors determining farmers' decision to cooperative membership status in Ethiopia was conducted with the aim of identifying factors influencing decision to membership in primary agricultural cooperatives in the study area. A multi stage stratified random sampling technique was used to select representative districts, kebeles, and farmers; and a total of 335 smallholder farmers (229 cooperative members and 106 non-membered farmers) were surveyed to collect primary data from two sample regions (Oromia and Southern Nations, Nationalities, and Peoples' Region) compromising of six sample districts from three respective zones. The research method mainly used to collect data was semi-structured interview schedule. Both descriptive analysis and econometric method of data analysis (using binary probit model) were used. The result of descriptive analysis showed that minimum annual dividend, low number of members compared to the expected, shortage of training access, low market access, farmers' preference of town center traders than cooperatives, and less interest of farmers to be a member of the primary cooperatives were the major challenges faced by famers and/or primary cooperatives in the study area. The result of econometric analysis revealed that eight among the 19 explanatory variables namely age of the household head, need to access credit, need to access agricultural inputs, perception of farmers towards the adequacy/attractiveness of dividend distributed, awareness about the socio-economic importance of primary cooperatives, trust towards cooperative management committees, households' need to access cooperative as a market outlet, and the need to access training from primary cooperatives were found to significantly determine smallholder farmers' decision to joining agricultural cooperatives in Ethiopia. From the finding, it is, therefore, recommended to stress on improving farming experience and exposures of farmers, increasing cooperatives' market demand for agricultural commodities/products, distribution of adequate dividend, provision of adequate credit services and agricultural technologies/inputs, organizing frequent capacity building trainings for farmers, and improving awareness of farmers about the socio-economic importance of cooperatives for encouraging and pooling smallholder farmers to join primary cooperatives in Ethiopia.

Keywords: *cooperative, dividend, credit, binary probit, chi-square, T-test*

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1. Introduction

Ethiopia is among the countries where agriculture plays a vital role in the economy. In the county, agriculture accounts for 40.2% of Gross Domestic Product (GDP), 80% of employment, and 70% of export earnings (United Nation Development [1]. About 85% of its population live in rural areas and depend on agriculture for necessities and as a source of employment [2]. Therefore the performance of this sector determines the fate of the economy of the country. Nonetheless, smallholder farmers who are illiterate, living on the threshold between subsistence and poverty dominate the sector. Their production system depends on out dated technologies coupled with lack of access to credit, market information, improved technologies, functioning markets (for inputs, outputs, finance, consumer goods, and services, etc.), and other infrastructure [3,4,5].

Farmers can overcome those problems by acting cooperatively to obtain collective strength that they would not have individually, and in doing so, they could find the path way out of poverty and powerlessness [6,7]. The international cooperative [34] defines "cooperatives as autonomous association of persons united voluntarily to meet their common economic, social, and cultural needs through jointly owned and democratically controlled enterprise". A reference [35] also defined cooperatives as "organizations set up by a group of persons or firms to perform services for members with an objective of securing better services, in terms of quality and cost". [36] writes that cooperatives are "essentially self-help groups of people who get together to meet member needs". Both definitions stress the fact that cooperatives are established to address member needs. Cooperatives are an ideal,

member-owned, business organization offering institutional framework through which members control both production and marketing activities there by fully address all the economic, democratic, and social dimensions of poverty reduction simultaneously [8]. More specifically, an agricultural cooperative is widely considered as a vital foundation helping smallholder farmers to overcome the constraints that hinder them from taking advantages of their business as it empowers economically weak farmers through enhancing their collective bargaining power and there by reduces the risks that they face in the market [9].

Several empirical studies showed that agricultural cooperatives improve farm productivity through their influence on the adoption of productivity-enhancing technologies [10,11,12] and by improving farm productivity [13,14].

In Ethiopia, cooperatives are actively involved in the dissemination of agricultural inputs and about 56% of chemical fertilizers were provided by cooperatives in the 2010 production season [15]. Cooperatives can also provide credit services to member farmers that ease production constraints [16]. Cooperative membership improves the commercialization behavior of smallholder farmers [17,18]. Commercialization improves food security and allocative efficiency at macro level [19]. Cooperative can also reduce transaction cost and information asymmetry by strengthening negotiation ability [20]. This will, intern, increase the income of farmers (members) through their bargaining power, which increase the price of the product they produced and lowers the costs of purchased inputs. Furthermore, more inclusive cooperatives play a strong social role in improving gender relations and helping women create safe space to build their social solidarity and problem-solving, particularly capacity in all-female cooperatives [20]. However, impressive contribution, the development of co-operatives is not without challenges. Among other common problems (as weak leadership, dependence on supporting organizations and a lack of working capital) for co-operatives in developing countries, low farmers participation is the major prevailing problem [21]. In the context Ethiopian, farmers' cooperative membership is generally very low. According to Reference [22], smallholder farmers' participation in agricultural cooperatives is very low (9 %) while around 40% of the households in the rural have access to cooperatives in their local Kebele.

Regardless of the case that agricultural cooperatives are one of the vital actors government assigned with the responsibility of improving smallholder productivity and commercialization, farmers may have several specific reasons for joining an agricultural cooperatives. Though, different studies [23,24] also confirmed the role of cooperatives in poverty reduction and in improving the livelihood of smallholder farmers, there are still cases where collective actions did not improve member farmers' situation discouraging others not to be a member of a given cooperative. The establishment and rapid expansion of primary cooperatives without adequate facilities and supports might also lead to many problems and failures. Though it is assumed beneficial to members, farmers' perception towards the importance of cooperatives and benefit they would get from their participation may matter in deciding their membership in a cooperative. There are many farmers in rural Ethiopia, who do not join

cooperative societies, despite the different technical and financial supports from the government. Despite the customary information that agricultural cooperatives are good tools for promoting community development, inefficiency, ineffectiveness and implication in corruption, and mismanagement of cooperative resources could be the factors affecting farmers' decision whether or not to join the agricultural cooperatives. This study thus aims to investigate the main factors that inspire rural people to join into the agricultural cooperatives. The analysis is important because the choice of individual farmers to join the cooperatives must be based on certain expected demographic, socioeconomic and legal and instutuional benefits. It will therefore be necessary to find out the socioeconomic, political, and intuitional factors that determine cooperative membership. Hence, the objective of the study was to identify factors determining decision to cooperative membership by smallholder farmers in Ethiopia focusing on Southern Nations, Nationalities, and Peoples' Region (SNNPR) and Oromia regional states.

2. Empirical Reviews

A study by [25] employed probit model to study factors influencing membership of farmers' in cooperative societies in Abia state, Nigeria. The result showed that age, farming experience, income, household size, and poverty level influenced cooperative membership in the study area.

The research of [26] used stepwise multiple linear regression analysis to examine factors affecting membership of sustainable oil palm grower cooperative among oil palm smallholders in Malaysia. Factors like gender, non-farm occupation, knowledge of cooperatives, community/society involvement, household income, commitment, perception, management and communication were identified as significantly influenced respondents in the decision to become members of the cooperatives.

[22] studied on factors affecting farmers' cooperative membership increment in Bench Maji zone, south-western Ethiopia; and in that level of education, information/media access, training, marketing and cooperative promotion offices' support, embezzlements of assets, attitude of farmers towards cooperatives, leadership commitment, trust among members and management committee, awareness level were found to statistically and significantly influence farmers' cooperative membership in the study area.

A study by [27] used logit model to identify determinants of coffee farmers' cooperative membership; and the result revealed that the probability of farmers' membership decision increases with age, education level, family size, and land property.

The study by [28] adopted probit regression analysis to determine factors influencing membership in coffee cooperatives in Huye district, Rwanda. The result showed that factors such as age of the household head, household size, distance to cooperative washing station, access to credit, experience in growing coffee and quantity of coffee produced were statistically significant factors influencing membership in coffee cooperative.

[29] conducted a study on determinants of rural people to join cooperatives in Northern Ethiopia using probit model. The finding illustrated that information access,

special skill, membership in rural association, frequency of attending a public meeting/workshop, household head education, credit access, training access, number of family members in school, distance to main market, availability of infrastructures, farmland ownership and farmland sizes are the major explanatory variables statistically influencing the rural people in joining the cooperative societies in the study areas.

[30] studied factors influencing cooperative membership preferences in Malaysian using logistic regression analysis and found that age and occupations are important predictors of cooperative membership preferences.

[31] used probit model to determine factors affecting membership to farmers groups in Uganda: evidence from the Uganda census of agriculture 2008/9 and found that individual characteristics including age, gender, marital status, and education do influence a farmer's decision to enroll in a farmer group.

[32] conducted a study on exploring factors affecting the decision whether or not farmers to join dairy cooperatives in Rwanda; and the findings revealed that farmers join cooperatives because of various reasons as need to access markets and agro-veterinary services, access to training opportunities, and the need to work with others. The study also reported that unable to afford membership fees, the poor performance of the cooperatives, and lack of awareness about the cooperatives were reasons for not yet joining that cooperatives.

3. Methodology

3.1. Description of Study Area

The study was conducted in Ethiopia comprising of two sample regions: Oromia regional state and south Nation nationalities and people's representatives (SNNPR). Two sample zones sample zones (namely south west shewa and Jimma zones from Oromia region and Gurage zone from SNNPR were represented in this study. A total of six sample districts two from each sample zone namely Dawo and Becho, Gomma and Limmu-Kossa, Abeshge and Cheha districts from south west shewa and Jimma and Gurage zones were selected for the study.

3.2. Sampling Techniques and Sample Size Determination

If a population from which a sample is to be drawn constitute a heterogeneous group (for our case members and nonmembers of agricultural cooperatives), stratified sampling is appropriate to be applied. The main advantages of stratified sampling were (i) more reliable information can be obtained from the same sample size if the population is stratified than from the population as a whole and (ii) comparisons between the two groups are easy as a separate but similar survey was done in each group. Hence, a multi-stage stratifying sampling technique was used to draw a representative samples for this study.

In the first stage, two regional states namely Oromia and SNNPR were selected from Ethiopia randomly. In the second stage two zones namely South west shewa and Jimma zones from Oromia region; and one zone namely Gurage zone from SNNPR region were selected randomly. In the third stage, a total of six districts, two from each zones, namely Dawo and Becho districts from 12 districts in south west shewa zone; Gomma and Limmu_Kossa districts from 17 districts in Jimma zone; and Abeshge and Cheha districts from 13 districts in Gurage zone were selected using simple random sampling technique. In the fourth stage, a total of 13 sample kebeles as depicted below in the table were selected randomly proportion to the total number of kebeles from each sample districts. Then, in the final stage, using the list of farm households from the respective agriculture office, farmers in each sample *kebeles* were categorized/stratified based on membership status into two as cooperative member and non-member farmers. Using Cochran (1963), a total of 335 sample farmers (229 members and 106 non-members) were selected randomly and proportionately from the sample *kebeles* (see Appendix Table A1) below.
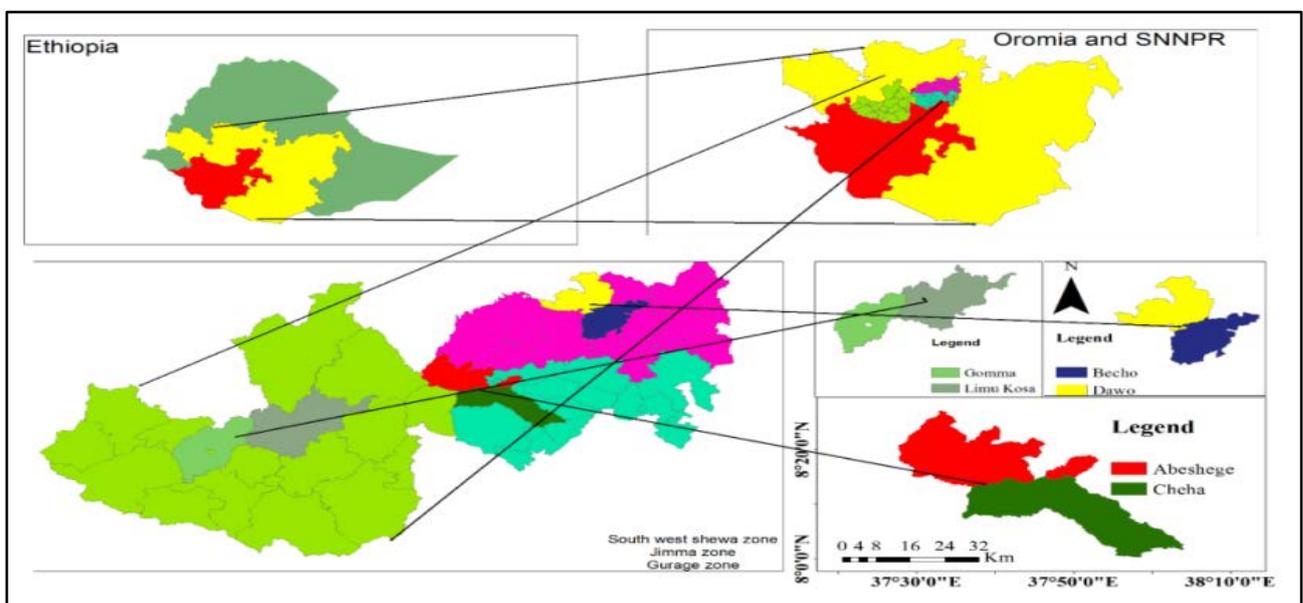

Figure 1. Map of the study area (Source: Computed from Arc GIS 10.3.1)

3.3. Data Types, Sources and Method of Data Collection

To achieve the objectives of the study, a combination of both qualitative and quantitative data were collected from mainly primary data sources. The primary data like demographic characteristics (age, sex, education, leadership, health status, marriage status, etc), socio economic information (farming/cooperative experience, asset ownership, land and capital ownership, credit access, infrastructural and other institutional supports etc…), and other important primary data were collected from primary sources, from members and non-members of cooperatives, using formal survey by semi-structured interview schedule. More importantly, pretesting of the semi- structured interview schedule was done before the formal data collection.

3.4. Method of Data Analysis

3.4.1. Model Specification

The study adapted a probit regression model to determine the important factors that affect farmers' decision to cooperative membership in the study area was employed. The underlying assumption is that any given farmer decides to join cooperatives if the expected utility from membership is higher compared to non-membership. Accordingly, the membership decision is modeled using the utility framework. A probit model (also called probit regression), is a way to perform regression for binary outcome variables. The probit model estimates the probability a value will fall into one of the two possible binary (i.e. unit) outcomes. Probit model for cooperative membership is appropriate to explain the probability of membership versus non-membership. A strictly dichotomous variable is sufficient for examining the participation of some problem such as cooperative membership in our case. The dependent variable in this study was a dummy variable (binary); depending on farmers' cooperative membership decision, took a value of one if farmers are members in any primary agricultural cooperative and zero if not. The explanatory variables used were both continuous and categorical (or binary). Therefore, in probit model, the decision of a farmer to join cooperative (adapted from Engleman, 1981 and Gujarati, 1988) was specified as follows:

$$Y^* = X\beta + \varepsilon, \varepsilon \sim N\left(0, \sigma^2\right) \qquad (1)$$

$$y_i = \begin{cases} 0, & if\ y_i^* \leq 0 \\ 1, & if\ y_i^* > 0 \end{cases} \qquad (2)$$

Where Y^* is the latent variable which would be observed in linear regression; y_i represents the probability of the binary dependent variable of the individual household whether deciding or not to be a member of any agricultural cooperatives. β shows the coefficient of independent variables which needs to be estimated, X_i represents the socio-economic, demographic and institutional factors expected to affect the cooperative membership, ε indicates the error term.

The relationship between a specific independent variable and the outcome of the probability is interpreted by means of the marginal effect, which accounts for the partial change in the probability of the dependent variable, membership in cooperative. The marginal effect associated with the explanatory variables X on the probability P (Yi=1/X), holding other variables constant, can be derived as $\dfrac{\partial P_i)}{\partial X_{ik}} = \beta_i$.

It represents by how much the probability of a change in the dependent variable is expected to increase or decrease for a unit change in an explanatory variable [33].

3.4.2. Definition and Hypothesis of Variables in the Model

Dependent variable: Cooperative membership (coop): The dependent variable in this model is a dummy (binary) variable representing farmers' cooperative membership status; taking a value of one if farmers are members in any of the agricultural cooperatives and zero if not.

Independent variables: Cooperative membership status was hypothesized to be influenced by a various household personal, socio-economic, physical environments and institutional characteristics. Based on the preliminary information and reviews, the following variables were defined and hypothesized accordingly.

Table 1. Summary of Definition and Hypothesis of Variables

Independent variables	Descriptions	Expected effect on cooperative membership
Region	Categorical 0. Oromia 1. SNNPR	Oromia (+)
Sex	Dummy: 0. Female 1. Male	Male (+)
Age	Continuous measured in years	+
Educational status	Dummy: 0. illiterate 1. Literate	+
Experience	Continuous: measured in years	+
Land holding	Continuous measured in hectare	+
Need to access credit	Dummy 0. Yes 1. No	+
Need to access agricultural inputs	Dummy 0. Yes 1. No	+
Adequacy of dividend distributed	Dummy 0. Yes 1. No	+
Awareness about socio-economic importance	Dummy 0. Yes 1. No	+
Need to access market information	Dummy 0. Yes 1. No	+
Trust to management committee	Dummy 0. Yes 1. No	+
Commitment of cooperative leaders	Dummy 0. Yes 1. No	+
Cooperatives' devotion to political issues	Dummy 0. Yes 1. No	-
Need to access cooperative as market outlet	Dummy 0. Yes 1. No	+
Need to access training	Dummy 0. Yes 1. No	+
Livestock ownership	Continuous measured in TLU	+
Non-farm income	Continuous measured in birr earned per year	-
Active family labor force	Continuous measured in number	+

4. Result and Discussions

4.1. Farmers Characteristics by Cooperative Membership

Table 2 below presented t-test and χ^2 results for mean and proportion comparison, respectively, of demographic, socio-economic, physical, and intuitional characteristics of sample farmers across participation in cooperative membership. The χ^2 test result showed that there was a significant difference in cooperative membership between the *zones* at 5% significance level. The result indicated that the proportion of farmer households who were a member of the primary cooperative from *South West shewa, Jimma and Gurage* zone are 31.9%, 40.2%, and 28%.

The chi-square test for the variables awareness of farmers towards the socio-economic importance of cooperatives and perception of farmers towards the political commitments of cooperatives beyond the expected duty were found to have significant difference among the cooperative membership at 1% significance level. As depicted in the table below, about 82.97% of farmers who have awareness that cooperatives played important role in socio economic development were member of the primary cooperatives; and 63.76% of membered farmers responded that rural cooperatives engaged in political issues beyond their primary duty. With regard to the women empowerment, about 74% of membered farmers believed that being a member of the cooperative helped women to be empowered. From the χ^2 test result, it could also be possible to indicate that farmers' need to access training and credit services and need of cooperatives as market outlet were found to have significant difference among cooperative membership status at 1% significance level. It could be implied that farmers join rural cooperatives because of the need to access the above aforementioned financial and institutional services coming via rural cooperatives.

4.2. Result of Econometric Analysis

Determinants of cooperative membership: As proposed in the methodology part, 19 independent variables were regressed with binary probit model. For the overall goodness of fit, parameter estimates was assessed based on the likelihood ratio test. The model chi-square test applying appropriate degrees of freedom indicated that the overall goodness of fit for the model is statistically significant at a probability of less than 1%. This implied that jointly the independent variables included in the model explained the membership in primary cooperatives.

The result of the probit regression model revealed that eight variables namely age of the household, need to access credit from cooperatives, need to access agricultural inputs from cooperatives, perception of farmers towards the a adequacy of dividend distributed, awareness of farmers about the socio-economic importance of rural cooperatives, farmers' trust to cooperative management, the need to access training via cooperatives and need to access cooperative as an alternative market outlet were found to significantly determine farmers' decision to joining agricultural primary cooperatives. The predicted probability of households to be a member of the primary cooperatives was nearly 75.6% (see Appendix TableA3).

Table 2. Mean/Proportion Comparison of Variables by Membership in Cooperative

Variable		Cooperative membership status			Pearson χ^2/ t
		Non- member (N= 106)	Member (N= 229)	Total (N =335)	
Region	Oromia	77.36	72.05	73.73	1.0533
	SNNPR	22.64	27.95	26.27	
Zone	South West shewa	20.75	31.88	28.36	8.25**
	Jimma	56.60	40.17	45.37	
	Gurage	22.64	27.95	26.27	
Sex (male, %)		79.25	84.28	82.69	1.28
Education status (literate %)		87.74	84.72	85.67	0.54
Formal education (year, mean)		4.56	3.92	4.12	1.54*
Age (year, mean)		41.11	43.31	42.61	-2.012**
Size of land owned (ha, mean)		3.88	3.8	3.82	0.26
Total family size (number, mean)		3.19	3.06	3.10	0.66
Farming experience (year, mean)		16.61	20.16	19.04	-3.12***
Awareness of farmers towards socio-economic importance of cooperatives (positive, %)		68.87	82.97	78.51	8.54***
Do you think primary cooperatives devoted for political agenda/issues beyond the duty (yes, %)		42.45	63.76	57.01	13.42***
Facilitation of different agricultural inputs by cooperative (yes, %)		59.43	65.94	63.88	1.33
Do you perceive you need credit access from cooperative (yes, %)		4.72	25.76	19.10	20.77***
Do you need access to training from cooperative (yes, %)		25.47	57.64	47.46	30.07***
Do cooperatives enable members to get better market information (yes, %)		55.66	52.84	53.73	0.23
Do you need primary cooperatives as means of market outlet (yes, %)		21.70	53.71	43.58	30.20***

***, **, and * represent significance level at 1%, 5% and 10% respectively, N=sample size
Source: Survey result (2018).

Table 3. Result of the Probit Model for Factors Determining Cooperative Membership

Probit regression			Number of obs = 335		
			LR chi2(19) = 119.23		
			Prob > chi2 = 0.0000		
			Pseudo R^2 = 0.2851		
Log likelihood = -149.47073		Marginal effects after probit	y = pr(coop) (predict) = .7556634		
Variables	Coefficient	Std. Err.	Z	P>|z|	dy/dx
Region	0.32	0.27	1.19	0.23	0.0959
Sex	0.30	0.22	1.36	0.17	0.1001
Age	0.02	0.01	1.68	0.09	0.0057
Educational status	-0.26	0.25	-1.04	0.30	-0.0760
Farming experience	0.01	0.01	1.09	0.28	0.0036
Size of land owned	0.04	0.04	1.00	0.32	0.0120
Need to access credit	0.97	0.26	3.76	0.00	0.2356
Need to access agricultural inputs	0.40	0.19	2.05	0.04	0.1289
Adequacy of dividend distributed	0.41	0.18	2.22	0.03	0.1272
Awareness about socio-economic importance	0.47	0.21	2.31	0.02	0.1608
Need to access market information	0.23	0.18	1.28	0.20	0.0732
Trust to cooperative management	0.94	0.24	3.86	0.00	0.2962
Commitment of cooperative leaders	-0.01	0.20	-0.07	0.94	-0.0047
Cooperatives' devotion to political issues	0.08	0.19	0.44	0.66	0.0268
Need to access cooperative as market outlet	0.43	0.21	2.07	0.04	0.1331
Need to access training	0.41	0.19	2.12	0.03	0.1279
Livestock ownership (TLU)	0.00	0.02	-0.25	0.81	-0.0015
Non-farm income	0.00	0.00	0.68	0.50	2.42e-06
Active family labor force	-0.05	0.05	-0.91	0.36	-0.0150
_cons	-2.28	0.62	-3.65	0.00	-

Source: Authors computations from survey data (2018)

Age of the household (age): Age of the household head influenced decisions by smallholder farmers to join primary cooperatives positively at less than 10% significance level. This indicates that any increase in age will lead to a corresponding increase in the probability of membership in cooperatives. A one year increase in the age of the households, citrus paribus, increases the probability of joining cooperative by about 0.57%. It was thus implied that people in the older age group are more likely to be members. This might be because as farmers stayed longer, they could accumulate the financial and other resources and more understand the importance and use of cooperatives to actively engage in the commitments and activities shared in the cooperatives. It may again expected probably because; the older may seem to be more credible in group formations than the younger who tend to be more aggressive and which in turn contributed in deciding to join primary cooperatives. The result of this study is similar to [25,27,28,30,31], where age of farmers matter cooperative membership preferences positively.

Need to access credit from cooperative: This variable influenced positively the likelihood of membership in agricultural cooperatives. It implied that availability of credit service from cooperatives attracts farmers joining cooperatives as far cooperatives can be regarded as a reliable source of credit compared to that of traders and formal lending institutions associated with collateral requirements. The result of probit analysis presented above revealed that the likelihood estimate of the need to access to credit from cooperative is positive and highly significant at 1% level. Other factors being constant, the need to access credit from cooperatives increase the probability of becoming a member of agricultural

cooperatives by 23.6%. The result agrees with [28,29] and [32] where access to credit influenced farmers' decision to join cooperatives.

Need to access agricultural inputs: Access to agricultural inputs is found to be significantly affecting the cooperative membership at less than 5%. Other factors kept unchanged, expectation of agricultural inputs by farmers from cooperatives increase the probability of membership by 12.9%. This implied that helping farmers to access services for instance agricultural veterinary services, crop seeds, animal breeds, artificial inseminations can inspire them to join agricultural cooperatives. The result is supported by [32] where more farmers can be pooled to the agricultural cooperatives when cooperatives provide agricultural inputs and technologies.

Awareness of farmers towards the socio economic importance of cooperatives: As expected, this variable determined decision to cooperative membership positively and significantly at less than 5% significance level. Compared to others, farmers having better awareness towards the socio economic importance of cooperatives would increase the expected probability of cooperative membership. The tendency of farmers with better awareness about agricultural cooperatives to become members was 16.1% times more compared to those with slight/no awareness. The result of this study agreed [26], [22], and [32] studies, where farmers who had more knowledge about cooperatives are more inclined to be members of agricultural cooperatives.

Perception of farmers towards the adequacy/attractiveness of dividend: other factors being unchanged, this variable affected the cooperative membership positively and significantly at less than 5% significance level. Other

factors being constant, as perception of farmers towards the adequacy/attractiveness of dividend distributed positive, the probability of being a member of the primary cooperative increased by around 12.7%, citrus paribus.

Farmers trust to cooperative management: As expected, this variable affected the cooperative membership positively and significantly at less than 1% significance level. Others variables kept unchanged, compared to farmers perceiving managements as embezzling cooperatives' assets, those having trust to cooperative managements would likely to increase the probability of cooperative membership by about 29.6%. The result of this study was supported by [22] who studied factors affecting farmers' cooperative membership increment in Bench Maji zone, south-western Ethiopia. The study tried to identify that level of Education, found to statistically and significantly influence the farmers' cooperative membership in the study area.

Need to use cooperatives as alternative market outlet: As expected the variable farmers need to access to market from cooperative was found to positively affect the probability of cooperative membership at less than 5% significance level. It was assumed that the probability of farmers to be a member of the primary cooperatives as they need to access market from cooperative is about 13.3%. That is, the attractive the cooperative market is, the more the likelihood would be the cooperative membership by farmers. This is mainly because in rural areas there are conditions to necessarily be a member of the primary cooperatives for selling their products and/or commodities via cooperative. The result of the study is also supported by [22] and [32].

Need to access to training via cooperatives: This variable influenced cooperative membership positively and significantly at less than 5%. This implied that more peoples can be attracted to the cooperatives with the provision of training. From the table above, the result showed that access to training via cooperative results in an increase in probability of cooperative membership by about 12.8%. This result is in line with the previous studies of [22,29,32] where serving farmers with training access can attract more peoples to the cooperatives.

5. Summary, Conclusions, and Policy Implications

Results from this study revealed that a good proportion (about 68.4%) of rural farmers in Ethiopia is belonged to farmers' agricultural cooperatives. Many studies investigated that agricultural cooperatives are basis for better income earnings and then for food security. The analysis revealed that those in the older age groups are more likely to become a member of rural cooperatives as compared to the younger farmers. The study thus concludes that cooperative membership is favourable to the older age groups resulting in the potential shortage of younger members. As a result, there will be implications on the governance and decision making in rural cooperatives. Therefore, government and cooperative managers better to focus on the sensitization and influencing of younger farmers on the benefits of being members of cooperatives so that they can have better understanding and information of potential of cooperatives. It was also shown that there

was a tendency farmer with better awareness towards the socio economic importance of cooperatives to be member of cooperatives. The result implied that the more the farmer cognizant with the importance of cooperatives, the more would be the tendency to join the rural cooperative. Hence rural cooperatives are recommended to arrange frequent awareness creation programs and extension services for motivating farmers to join rural cooperatives. The study shows that awareness of farmers towards the socio-economic importance of cooperatives has positive and significant relationship with farmer's membership. Based on this reality, cooperative agency should take an appropriate measure to establish awareness building campaigns for the households on the nature benefit of cooperatives. Therefore, creating awareness about the philosophy and benefits of agricultural cooperatives to the general public mainly to the youth helps to bring new heads to the cooperatives and it is very important for the sustainable development of cooperatives. In this aspect, in order to increase farmer membership, there is a need to create more awareness campaigns about the benefits of being in cooperatives.

From the point of view of dividend, cooperative members were not in a position to get enough dividends and not get satisfied by the distribution of dividend by the cooperatives. The result of this study is evidence that distribution of dividend can increase the number of members to the cooperative. Therefore, the cooperative provide adequate dividend to satisfy the existing members and then attract new members and pave way for increased membership in the cooperatives. Our analysis also showed that access to market from cooperatives has also positive and significant relationship with farmers' membership. Cooperatives should take an appropriate measure to increase capacity in the respect of market access for farmers; because market access increases business volume, financial strength and attract new members too. From the study, it is understood that farmers are more possible to join agricultural cooperatives in the expectation of access to credit rom cooperatives meeting costs related with their agribusiness activities. The government should promote policies in strengthening the financial capabilities of cooperatives by providing credit facilities thereby farmers would be benefited from such supportive and encouraging supplies which indirectly helps to attract in many more peoples to the cooperatives.

According to the finding of this study, the government can increase a number of rural based cooperative societies by giving more attention to dividend, strong cooperative management, and training services, agricultural inputs, and marketing capacity of cooperatives for smallholder farmers via cooperatives. These ways it can attract more people to join the rural cooperatives and then get the different economic and social advantages from the cooperatives in order to ensure household food security. The study in general recommended suitable policies aimed at appealing younger farmers to join cooperatives; provision of important institutional supports and inputs (training, credit, and market facilities, agricultural technologies); increasing distribution of attractive and adequate dividend; arrange trainings and awareness creation campaigns; establishing management bodies working with honesty without embezzling cooperatives' assets; receiving more products

from farmers in order to increase cooperative membership. Future comprehensive research recommended to be studied on the performance of agricultural cooperatives, economic, livelihood and food security impacts of cooperatives on the smallholder farmers in Ethiopia.

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Appendices

Appendix Table 1. Proportional Determination of Size of Sample Farmers

District	*Kebele*	Total number of households	Number of households (member)	Number of households (non-member)	Sampled farmers (member)	Sampled farmers (non-member)	Total sampled farmers
		N	N_1	N_2	n_1	n_2	n
Becho	Awash Bune	808	544	264	19	9	28
	Mede Guddina	773	543	230	19	8	27
Dawo	Maket	721	486	235	17	8	25
	Tajjab	978	658	320	23	11	34
Limmu-	Babiya Kemise	617	429	188	15	7	22
Kossa	Denbi Gaban	583	400	183	14	7	21
Gomma	Choche Lemi	1110	772	338	27	12	39
	Genji Ilbu	1150	772	378	27	13	40
Abeshge	Lache	751	515	236	18	8	26
	Fete Jeju	579	401	178	14	6	20
	Efeke Tereke Wedero	454	315	139	11	5	16
Cheha	Efeke Tereke Endebera	516	343	173	12	6	18
	Sissee & Ematende	542	372	170	13	6	19
Total		9582	6550	3032	229	106	335

Appendix Table 2. Result of Correlation Analysis for Major Variables: Correlation Matrix

```
. corr coop sex edus exp credit input dividended awarness market_info trust_mgt committement_leaders politics markt_outlet training
(obs=335)

                   coop      sex     edus      exp   credit     input  divide~d  awarness  market~o  trust_~t  commit~s  politics  markt_~t  training

        coop     1.0000
         sex     0.0619   1.0000
        edus    -0.0401   0.1056   1.0000
         exp     0.1687   0.0986  -0.0348   1.0000
      credit     0.2490   0.0418   0.0687   0.0119   1.0000
       input     0.0630  -0.0649   0.1359  -0.1586  -0.0298   1.0000
  dividended     0.2417   0.0470   0.1534   0.0001   0.0898   0.1763   1.0000
    awarness     0.1597  -0.0089  -0.0688   0.0252  -0.0230   0.0150  -0.0026   1.0000
 market_info    -0.0263  -0.0607  -0.0377  -0.1403  -0.1582   0.1373  -0.0239  -0.0774   1.0000
   trust_mgt     0.3325  -0.0725  -0.1175   0.1260   0.0971  -0.1638   0.1190   0.0398  -0.0037   1.0000
committeme~s     0.1836   0.0590  -0.0340   0.0465   0.1040   0.0700   0.1229   0.1619  -0.1830   0.1386   1.0000
    politics     0.2001   0.0648  -0.0109   0.0887   0.1152  -0.0755   0.0782   0.1035  -0.1043   0.2803   0.3696   1.0000
markt_outlet     0.3003  -0.0433   0.1361   0.0811   0.0935   0.2599   0.3813   0.0642   0.1033   0.2864   0.1566   0.1673   1.0000
    training     0.2996  -0.0075  -0.0378   0.1705   0.0399   0.0676   0.3402   0.0607  -0.1131   0.2564   0.2253   0.1129   0.3219   1.0000
```

Appendix Table 3. Result of Probit Model Analysis

```
. probit coop region sex age edus exp land credit input dividended awarness market_info trust_mgt committement_leaders politics mar
> kt_outlet training livestock nonfarm labor

Iteration 0:   log likelihood = -209.08685
Iteration 1:   log likelihood = -151.16756
Iteration 2:   log likelihood = -149.47856
Iteration 3:   log likelihood = -149.47073
Iteration 4:   log likelihood = -149.47073

Probit regression                               Number of obs   =        335
                                                LR chi2(19)     =     119.23
                                                Prob > chi2     =     0.0000
Log likelihood = -149.47073                     Pseudo R2       =     0.2851

                coop        Coef.   Std. Err.       z    P>|z|     [95% Conf. Interval]

              region     .3238243   .2720851     1.19   0.234    -.2094527    .8571013
                 sex     .3000717   .2208564     1.36   0.174    -.1327988    .7329422
                 age     .0180393   .0107241     1.68   0.093    -.0029795    .0390581
                edus    -.2593917   .2485099    -1.04   0.297    -.7464621    .2276788
                 exp     .0115811   .0106629     1.09   0.277    -.0093178     .03248
                land     .0382166   .0383608     1.00   0.319    -.0369692    .1134023
              credit     .9662535   .2567602     3.76   0.000     .4630127    1.469494
               input     .397429    .1942592     2.05   0.041      .016688     .77817
          dividended     .405298    .1829281     2.22   0.027     .0467655    .7638304
            awarness     .4739451   .2052908     2.31   0.021     .0715826    .8763076
         market_info     .2319394   .1812068     1.28   0.201    -.1232194    .5870982
           trust_mgt     .9435773   .2443943     3.86   0.000     .4645733    1.422581
committement_leaders    -.0148543   .1984649    -0.07   0.940    -.4038383    .3741297
            politics     .0849402    .191258     0.44   0.657    -.2899186    .4597991
        markt_outlet     .4339308    .209376     2.07   0.038     .0235614    .8443001
            training     .4120494   .1941344     2.12   0.034     .0315529     .792546
           livestock    -.0047338   .0193063    -0.25   0.806    -.0425735    .0331059
             nonfarm     7.71e-06   .0000114     0.68   0.498    -.0000146     .00003
               labor    -.0478359   .0526074    -0.91   0.363    -.1509444    .0552727
               _cons    -2.277563   .6231377    -3.65   0.000    -3.498891   -1.056236
```

```
. mfx

Marginal effects after probit
     y  = Pr(coop) (predict)
        =   .7556634
```

variable	dy/dx	Std. Err.	z	P>|z|	[	95% C.I.	]	X
region*	.0959272	.07532	1.27	0.203	-.051705	.243559		.262687
sex*	.1000869	.07742	1.29	0.196	-.051652	.251826		.826866
age	.0056626	.00338	1.68	0.093	-.000953	.012279		42.6149
edus*	-.0759633	.06746	-1.13	0.260	-.20818	.056254		.856716
exp	.0036354	.00333	1.09	0.276	-.002901	.010171		19.0418
land	.0119964	.01203	1.00	0.319	-.011578	.035571		3.82312
credit*	.2355582	.04657	5.06	0.000	.144283	.326834		.191045
input*	.1289112	.06428	2.01	0.045	.002932	.25489		.638806
divide~d	.1272255	.0574	2.22	0.027	.014717	.239734		.483582
awarness*	.1608407	.07404	2.17	0.030	.015731	.30595		.785075
market~o*	.0731547	.05707	1.28	0.200	-.038709	.185018		.537313
trust_~t	.2961946	.07408	4.00	0.000	.151	.44139		.346269
commit~s*	-.0046557	.0621	-0.07	0.940	-.126375	.117064		.647761
politics*	.0267688	.06058	0.44	0.659	-.091972	.145509		.570149
markt_~t*	.1330563	.06222	2.14	0.032	.011112	.255		.435821
training*	.1279457	.05965	2.14	0.032	.011027	.244864		.474627
livest~k	-.001486	.00606	-0.25	0.806	-.013364	.010392		6.45056
nonfarm	2.42e-06	.00000	0.68	0.498	-4.6e-06	9.4e-06		2761.54
labor	-.015016	.01655	-0.91	0.364	-.047448	.017416		3.10448

(*) dy/dx is for discrete change of dummy variable from 0 to 1